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FIDUCIARI AND FIRM LIQUIDITY CONSTRAINTS: THE ITALIAN EXPERIENCE WITH GERMAN-STYLE UNIVERSAL BANKING

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Abstract

This study presents new evidence on the role of bank relationships in attenuating Italian firms' liquidity constraints and interprets the findings in comparison with those from a similar study of the German case. Employing investment models on a panel of 170 firms between 1903 and 1911, the analysis shows that bank relationships had little effect on the liquidity constraints of the general population of investing firms, but that they may have attenuated liquidity constraints for new firms. Analysis of the characteristics associated with bank-attached firms indicates that such firms were significantly different from independent firms, and that German-style banks may, therefore, have been important for *ex ante* monitoring and signaling to investors. The results for Italy accord well with the German experience, and thus universal banking appears, in general, to have had limited impact on the investment patterns of firms during industrialization.

Fiduciari and Firm Liquidity Constraints: The Italian Experience with German-Style Universal Banking*

Caroline Fohlin

Financial institutions are thought to have played a vital part in the industrialization of some economies, and particular emphasis has been placed on the role of the joint-stock universal banks in German economic development.[1] At the end of the nineteenth century, German bankers established two joint-stock banks in Italy; creating them in their own image. Given the influence attributed to the universal banks in Germany, it is natural to ask whether and how this style of financial intermediation affected Italy's economic development.

Universal banking, because of its combination of investment and commercial banking functions in one institution, is thought by some to be a more efficient system of corporate finance than its compartmentalized counterparts–particularly in the United States and Britain.[2] Universal banking is also often identified with the institution of interlocking directorates–the practice of placing bank representatives on the boards of directors of industrial firms and vice versa. Interlocking directorates, in turn, are seen as encouraging close, long-term relationships between banks and nonfinancial firms. Benefits of a financial system based in large part on close relationships between firms and financiers might

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[1]See, for example, Eistert (1970), Gerschenkron (1962), Jeidels (1905), Riesser (1910), Schumpeter (1939), Tilly (1965), and Tilly (1991).

[2]See the recent work of Calomiris (1995) for a comparison of the American and German banking systems in the early twentieth century. See Kennedy and Briton (1985) comparing Britain and Germany.

include the provision of entrepreneurial advice to industrialists and the alleviation of moral hazard problems associated with asymmetric information. Firms for which moral hazard problems have been diminished may enjoy more efficient investment–including preferential financing terms and loosened liquidity constraints. Moreover, economies of scope in financial and information intermediation, should translate, all else equal, into lower costs of finance–even in the presence of information asymmetry.

This study offers insight into the impact of universal banking in Italy by presenting new evidence on the effect of bank relationships on industrial firms' investment patterns. Using a panel of 125 industrial firms between 1903 and 1910, the analysis compares the liquidity sensitivity of investment of firms with and without close relations with the principle German-style universal bank–Banca Commerciale Italiana. The results suggest that bank relationships had little effect on the liquidity constraints of the general population of investing firms, but that they may indeed have attenuated liquidity constraints for very young firms. Furthermore, discrete choice analysis of the characteristics associated with bank-attached firms indicates that such firms were larger, more liquid, and more profitable than independent firms. The findings suggest that BCI may, therefore, have been more important for *ex ante* monitoring and quality signalling than for interim or *ex post* monitoring of firm behavior and outcomes.

Research on the investment patterns of industrial firms can help resolve the still-contentious historical debate over the importance of mixed banks during Italy's industrialization. Many historians have contended that the German style of financing provided a significant stimulus to German industrialization, but few have attempted to analyze quantitatively the influence of this form of banking in Italy. The current study begins to fill this gap in the literature. More generally, this study also provides evidence on the influence of financial structure on investment and economic growth while also offering empirical tests of recent theories of financial intermediation.

BACKGROUND

The time between the political unification of Italy (1861) and the first World War (1914) is generally considered the formative period for Italian industry. In identifying a point at which industrialization began, economic historians invariably point to these years, but not all agree on the pattern of growth within the interval. Table 1 compares growth rates computed by various sources.[3] Although authors disagree on the existence of an industrial spurt, none questions that the Giolitti Era (1896-1913)–perhaps extending to 1925–was one of strong growth in industrial production.

Table 1 here.

The Italian financial system before unification in 1861 was relatively unsophisticated and disjointed. Savings banks grew rapidly in the 1820's and thereafter, and banks of

[3]See Federico and Toniolo (1992) for an in-depth discussion of various indices of industrial production. See also Cohen (1977) for a survey of major industrial sectors.

issue–notably, the Banca Nazionale Sarda, Banca Nazionale Toscana, and the Banca di Sconto e Anticipazioni of Parma–were established mid-century. Before 1861, however, states, provinces and even towns had their own monetary systems. Tuscany alone had 24 currencies.[4] By 1865, Italy had joined the Latin Monetary Union under a bimetallic standard. Unification of bank notes, however, did not come until 1893, with the founding of the Banca d'Italia.

Even after 1861, the financial system was compartmentalized, with savings, investment, and commercial operations generally carried on by separate institutions (with the possible exception of the Credito Mobliare). The business of banking was also quite volatile. Joint-stock banking flourished in the early 1870's; growing from 17 firms with capital of 165 million Lire in 1869 to 143 firms with a capital of 793 million Lire in 1873. By 1879, however, their numbers had declined to 101, and their capital had fallen 66 percent to 269.6 million Lire.[5] Then, after a decade of relative calm, the financial system suffered a severe crisis in 1893-4. Many banks failed, including Banca Romana (one of the banks of issue), Credito Mobliare and Banca Generale (the two deposit banks).

Despite the devastation of the existing system, the banking crisis may be seen in a positive light, since it prompted the establishment of a central bank (Banca d'Italia) and allowed the development of German-style universal banking in the form of Banca Commerciale Italiana (BCI) and Credito Italiano (CI). Because of severe economic and political shortcomings in Italy toward the end of the nineteenth century, and because of the fits and starts through which previous industrialization attempts had gone, Alexander Gerschenkron attributed great importance to the rise of German universal banking in Italy: "It is possible to surmise that the upsurge of 1896-1908 was largely rendered possible by the importation of the great economic innovation of German banking in its most developed and mature form."[6] Jon Cohen, in his dissertation on finance and Italian industrialization, concurred with Gerschenkron, stating that "the Banca Commerciale Italiana and the Credito Italiano brought the German techniques of industrial credit banking to Italy. These innovations were the most important changes which the crisis of 1893-94 produced, and they profoundly affected the industrial growth of the nation."[7]

Table 2 gives the founding dates, origins, and size of the four principle credit banks in operation prior to World War I. BCI was created in 1894 out of the remains of the Credito Mobliare by a consortium of the largest German banks with the addition of Austrian and Swiss capital. The Credito Italiano was founded the following year in a similar manner, though Italians played a greater role in the original finance and management of CI than they had in BCI. BCI and CI, were the largest credit banks by far throughout the period–though relative to their meager beginnings, the two Italian-backed banks experienced remarkable growth over the period.

[4]Clough (1964), p. 21. He also gives an overview of the development of various financial institutions from the beginning of the nineteenth century. See also Zamagni (1993) and Cohen (1977).

[5]See Clough (1964), pp 119-20.

[6]Gerschenkron (1955), p. 374.

[7]Cohen (1977), p. 85.

Table 2 here.

The two German-backed banks were the most important credit banks, though there were several other joint-stock credit banks in operation at the time. The Germans, however, were relative late comers and were not the only foreigners involved in finance in Italy. The Credito Mobliare, out of which BCI was created, was an 1856 reincarnation of the Rothschild-backed Cassa Industria e Commercio in Turin. Operating on the same principal as the Crédit Mobilier, the Credito Mobliare had an important hand in the development of railroads in Italy. Thus, France's pre-unification influence on the peninsula extended beyond military and political pursuits into the realm of banking and finance.

The use of the term German banks' may exaggerate the true influence and control of German bankers even over the two banks they helped found. It is often emphasized that BCI was first managed by two Germans. While the first managers of BCI were both born in Germany, they had lived in Italy most of their lives and had spent their careers in Italian banks: Otto Joel at the Banca Generale and Federico Weil at the Credito Mobiliare. Furthermore, both Confalonieri (1974, 1982) and Hertner (1984) have shown that the founding consortium for BCI never intended a protracted engagement in Italy, but rather planned to relinquish ownership quickly. As the Germans began to retrieve their capital from BCI and CI at the start of the twentieth century, they were replaced in large part by French investors–including the Banque de Paris et des Pays Bas.[8] Thus, French bankers, who had started the bank on which BCI was founded and who later controlled a large portion of BCI shares, clearly played a significant role in German-style banking in Italy. [9]

Regardless of the impetus, industrial finance in Italy was clearly more heavily dominated by banking institutions than by capital markets throughout the pre-WWI period. A look at two ratios–the financial instruments ratio (FIR) and the financial intermediation ratio (FIN)–confirms the qualitative impression that banking institutions grew rapidly relative to overall financial instruments during the first push of heavy industrialization. FIR is defined as the ratio of total financial instruments to total wealth, and FIN is defined as the ratio of financial intermediaries' assets to total liabilities of the economy–including the public, private, and foreign sectors. Table 3 gives these ratios as well as their annual average growth rates between 1881 and 1971.[10] Though intermediated assets clearly grew relative to overall financial assets between 1881 and 1914, the share of intermediated assets in the economy grew only slightly faster during the first phase of industrialization than during the interwar years, and they grew quite a bit more slowly in the early years than in the post-WWII era.

Table 3 here.

Perhaps of greater relevance for this study is the share of banking assets held by

[8]See Zamagni (1993), p. 145.

[9]See Goldsmith (1969, pp. 360-7) and references cited therein for a summary of the role of foreign banks worldwide.

[10]For international comparisons, see Goldsmith (1969).

the principle credit banks described in Table 2. These four banks together held only two percent of all bank assets in 1895 (more than half of which were held by BCI), but by 1911 they held 15 percent of the total. BCI and CI alone held 10 percent of bank-held assets in 1911 (6.2 percent for BCI and 3.8 percent for CI). Thus, relative to other financial intermediaries, the credit banks, and BCI in particular, were positioned to exercise significant influence over the finance of industry during the decade before the First World War.

Despite the appearance of a surge in industrial growth beginning in 1896, most agree that, in international comparison, Italy's takeoff was disappointing. Gerschenkron (1955) offered several explanations for this failure–including the end of the railroad boom, an unfavorable political environment, and a lack of industrialization ideology amongst the masses. According to Gerschenkron, however, the most important inhibitor to growth was the state's tariff policy–a system that propped up old, declining industries rather than promoting emerging entrepreneurs in chemicals and engineering. In the 40 years since Gerschenkron published his work on Italy, several quantitative studies have contradicted all of his hypotheses about roadblocks in Italy's industrialization.[11] Confalonieri (1974, 1982) has even claimed that the principle German-style bank, BCI, did not have an industrial strategy, and that financing was provided on the basis of profitability.[12] Still others have suggested that the financial system had a distorting effect on the economy as a whole.[13] Yet few have attempted to measure systematically the microeconomic benefits of German-style banking in Italy. Understanding the role of financial structure in economic development hinges on a clearer analysis of such microeconomic forces. The empirical sections of the current study take up this problem, and the next section discusses a framework for doing so.

FINANCIAL INTERMEDIARIES AND FIRM LIQUIDITY CONSTRAINTS

Theories explaining the existence of financial intermediaries abound, but Diamond's (1984) delegated monitoring theory offers a particularly plausible and intuitive explanation for the viability of German-style universal banking. Diamond's version of the delegated monitoring theory justifies the use of intermediaries instead of direct investment by each investor in individual firms. Since monitoring requires resources from each participant, the higher the number of investors, the higher the cumulative cost of monitoring a given enterprise. This is because an individual who pays to monitor has no incentive to reveal to other investors what she or he has observed. When the number of investors in a given project is high, each investment is small, and, therefore, costly observation may not be worthwhile to the individual. Small investors may instead decide

[11]For example, Barone (1972), Fenoaltea (1973, 1983), Lanaro (1979), Toniolo (1977, 1990). All of these studies are considered in Federico and Toniolo (1992).

[12]Such policy is not necessarily antithetical to a promotional ideology. In fact, most theories of financial intermediation rest on the notion that activities are mutually advantageous to firms and financiers.

[13]See Cohen (1977), pp. 139-43, for a summary of his findings.

to appoint a monitor by depositing funds with a banker and allowing that institution to observe the firms' activities. In order to guarantee repayment, the monitor then diversifies its involvement over many different industries and offers low-risk investments to its depositors.

The Diamond delegated monitoring theory is a static one, though, and the qualitative history on universal banks focuses on the long-term nature of the relationships between firms and financial institutions. Thus, the delegated monitoring theory provides a good starting point for a theoretical framework, but it should be supplemented and revised to account for the dynamic character of financial relationships. Benefits of attachment may accrue over the tenure of the bank-firm relationship, resulting in dynamic economies of scale in the provision of finance. This may result in significantly different economic outcomes than those implied by the delegated monitoring theory.

Such theoretical considerations motivate the investigation of the link between investment and liquidity. A long line of previous work, including Meyer and Kuh (1957), has suggested that firm liquidity is an important determinant of investment. More recently, Fazzari, Hubbard, and Petersen (1988), Hoshi, Kashyap, and Scharfstein (1991), among others, have tested the empirical disparity in this investment-liquidity relationship according to *a priori* assumptions about the difference in information problems firms face.[14] In the case of the latter paper, the authors have assumed that a bank acting as a monitor will have better information about its clients' investment opportunities than would individual investors. Because of this amelioration of asymmetric information problems, a firm's investment will depend only on the quality of projects and not on the availability of funds. This same asymmetric information problem will cause unmonitored firms–who cannot defend the viability of each project to individual investors–to wait to invest until they have accumulated sufficient internal liquidity. If intermediaries are successful, such accumulation will be unnecessary, and investment should become less sensitive to liquidity.

Two additional tests of information dissemination by financial intermediaries, and by banks in particular, follow from Ospina (1994) and James (1987). Using a recent panel of Colombian firms, Ospina (1994) demonstrates that certain firms have particularly clumpy investment patterns–that is, investment is concentrated in one year, rather than being dispersed throughout the period. Close bank relationships may reduce such clumpiness, and, thus, one ramification of diminished liquidity constraints may be the smoothing of investment streams. Alternatively, James (1987) uses a random sample of announcements of bank credit arrangements, private placements of debt, and public offerings of straight debt in the U.S. and determines if stock prices (that is, firm values) respond differently to the various kinds of financing. He finds that abnormal performance is positive and statistically significant for bank loan announcements, but it is non-positive for publicly traded debt and negative for debt placed privately with insurance companies. He concludes, therefore, that banks offer special information services about the profitability of

[14]See also, Elston (1995), Fohlin (1995b), Houston and James (1996), Ospina (1994), and Ramirez (1995).

firms' investments. That is, banks provide *ex ante* monitoring services.

The results in the preceding papers indicate that certain forms of financial intermediation may reduce asymmetric information costs. While these findings uphold the delegated monitoring theory, they also support a dynamic economies of scale hypothesis: the two theories are not mutually exclusive. Thus, to differentiate between the two theories, additional evidence is required. If a dynamic view of the role of universal banking is appropriate, the data should demonstrate shifts in firm behavior or characteristics over the sample period. For example, liquidity constraints may continue to diminish as the monitor gathers more information, and this may imply that intermediaries are more important for industrial sectors in which information is difficult to obtain or interpret. Thus, in contrast to the inference from the static monitoring model, dynamic models may imply that financial intermediaries should specialize in particular industries.

DATA

To compare firms with and without close bank ties, some definition the properties of each group is needed. The Banca Commerciale Italiana (BCI) and the Credito Italiano (CI) were the only large mixed banks in Italy at the turn of the century. Historians generally agree, however, that BCI was more successful in following the German paradigm than was Credito Italiano. Since historical data is also more readily available for the former, this study focuses on the impact of BCI relative to all others.[15]

The following three sets of data from the BCI archive aided in determining which firms were closely connected to the bank and which firms were not: 1. Records of the number and value of shares held by BCI in particular firms. 2. Lists of firms with large current accounts and pre-approved credits with BCI. This offers another measure of the extent of financial interaction between the bank and its associated firms.[16] 3. A list of *Fiduciari*–bank employees that sat on its associated firms' boards, were managers at the firms, or were closely involved in some other way to the firms' operations or investment decisions.[17] This information provides an idea of which firms received managerial and

[15]In choosing the sample of unattached firms, all recognized Credito Italiano firms were discarded. Firms that had connections with both BCI and CI were also discarded, unless the contact with CI was minimal. Imagine, however, that some CI firms slipped into the sample. How would this affect the results? Since CI was a German-style bank, inclusion of some of its firms in the attached-firm sample would only increase the generality of the statements made about Italian mixed banking. If CI firms were inadvertently included in the unattached sample, it could artificially weaken the findings on liquidity constraints for independent firms. Thus, the danger in accidentally including CI firms is that we may understate the liquidity constraints on unattached firms. Since every firm included in the two samples was confirmed by at least two bank archivists as being attached to BCI or unattached to either BCI or CI, this danger is small.

[16]I used tables in Confalonieri (1975, 1982) for the first two criteria, since he compiled this data from original bank records. Additional information came directly from archival documents.

[17]The list was compiled by Francesca Pongolini, Chief Archivist at BCI. I thank her for allowing me access to this information. An appendix of NS includes an alphabetical listing of board members with references to all seats on firms listed in the given volume.

entrepreneurial advice. According to these three criteria, 90 firms appeared to be closely linked to BCI during its early years (1894-1914). In the following, I refer to these firms as 'attached' or 'BCI' firms and the firms without apparent bank connections as 'unattached' or 'independent' firms.

Balance sheet data for the study are extracted from the 1912 *Notizie Statistiche* (NS)--a biennial compilation of balance sheet summaries of principal joint-stock firms–for the period 1903-1911. In the 1912 edition, NS includes all joint-stock firms with share capital exceeding one million Lire. The NS data is compiled from the firms themselves, as well as from the BUSA (*Bollettino Ufficiale delle Societa Azionarie*), legal announcements of local governments (*Fogli degli Annunzi Legali delle Prefetture del Regno*), and national courts (*Tribunali del Regno*).[18] Eighty-five of the firms determined as attached are reported in the 1912 NS; Sixty-six are currently included in the sample. To provide a control group against which to compare the BCI-attached firms, the sample was augmented with a group of 85 unattached firms representing the same sectors as the attached firms (sixty-one are included in the current sample).[19] The NS lists firms by size within each sector. Since the BCI firms were typically the largest in each sector, I chose the next largest firms for the unattached sample in order to parallel as closely as possible the characteristics of the attached firms. Though all of the firms still existed as of the last year of the period (1911), they may have begun operations at any time preceding that year. As a result, the panel is unbalanced.

The following data are reported for each firm: share capital, face value of shares, fixed capital, inventories, securities and credits, miscellaneous liabilities, profits, payments to reserves, payments to the board of directors, total and per share dividends, and depreciation (when applicable). In the case of firms with stock market listings, the minimum and maximum share price is also indicated for each year in which the shares were listed. Investment is defined as the first difference of gross fixed capital. The sum of securities and credits represents stock liquidity and is lagged one period, since investment decisions are likely to be based on the liquidity of the previous period–if at all. Cash flow is defined as retained earnings including payments to reserves.

The NS also reports the year of constitution of each firm. The source, it should be noted, indicates only a few cases in which a firm operated under an alternative corporate form before becoming a joint-stock company. Thus, it is not entirely clear from the reported date whether a firm was new or transformed in the given constitution year. This ambiguity may complicate the analysis and interpretation of firm behavior in the case of young firms and is addressed at greater length in the final section of the paper.

Table 4 compares descriptive statistics for the two samples of firms. The last two columns present the sample means for attached and independent firms, respectively. The

[18]The data sources are discussed in a general manner in a foreword to the 1912 volume of NS.

[19]The care with which the unattached firms were selected should be emphasized. Laura Contini and other BCI archivists provided invaluable help in verifying the independence of the unattached firms in the sample. Selection of the bank-attached sample received similar attention.

data are summarized for 1910, a year in which all firms were already included in the sample, in order to reduce the bias that may be introduced by staggered entry into the samples. If attached and independent firms have substantially different age distributions, then pooling years may exaggerate differences between the samples that stem from trend effects (such as inflation). The final two rows of the table give the number and percent of observations in the sample for 1910 and for all years pooled and indicate that attached firms account for a slightly greater proportion of observations in the overall pool than for 1910 alone.

Table 4 here.

Table 4 documents several differences between attached and independent firms. The most obvious disparity is in size. Attached firms were on average 3.5 to 4 times larger than independent firms in terms of both share capital and fixed assets. Bank-attached firms were also more liquid and more profitable on average than independent firms–even accounting for size. Average investment by attached firms, however, was fifty-seven percent of that of independent firms.

Additionally, BCI firms had a higher average debt/equity ratio than their independent counterparts, were more often listed on one or more stock exchanges, and also payed higher dividends (in both levels and percentage terms). These findings fall in line with expectations: debt should be relatively inexpensive to firms with close bank connections, since the bank will presumably have higher volume and quality of information on the firms on whose boards it sits. Curiously, however, the interest rate paid on bonds diverged little from 4.5 percent, whether or not the firm was attached to BCI. In the few cases that rates did diverge from 4.5 percent, however, it was bank-attached firms paying four percent and independent firms paying five percent–again, as would be expected. The fact that bank-attached firms were much more likely to have listings on one or more stock exchange (and that listed attached firms were on average listed on more bourses than unattached firms) may stem from the size of attached firms and not bank attachment itself. In fact, bank attachment may have been a result of listing in some cases, if the process of obtaining entry onto a bourse required the aid of an intermediary.[20] The higher average dividends–and payments to board members–could simply derive from the higher profits of attached firms. Firm charters typically regulated the percentages of profits to be paid out in dividends and remuneration of board members, however, certain firms may have paid out more than they were allowed or could afford.[21]

While the average face value of shares was similar for the two subsets of firms, the average number of shares outstanding was 2.4 times higher for attached firms than for independent firms. Since the source provides no information on ownership structure, it is impossible to infer the relative dispersion of ownership between attached and independent firms. Nonetheless, the fact that the relatively large paid-in capitals of attached

[20]This scenario seems likely and is similar to the German case. See Fohlin (1995a) for possible explanations for the rise of interlocking directorates in Germany at the end of the nineteenth and beginning of the twentieth centuries.

[21]See Cohen (1977).

firms resulted mainly from a high number of shares outstanding, and not from a particularly high share price, may indicate that attached firms were more widely held than independent firms. Dispersed ownership might have led to interlocking directorates for two reasons. First, due to a perceived lack of control, individual investors holding small stakes in several firms, may have sensed the need for outside monitoring of firm behavior and performance. By consolidating oversight in the hands of an individual bank, small shareholders may have attempted to insure themselves against firm malfeasance. Second, BCI, perhaps capitalizing on a lack of motivation on the part of depositors, may have pursued and been able to obtain proxy voting rights from small investors. Having underwritten a firm's securities, BCI would have been in the position to sell shares to a wide range of customers and may have held its customers' shares on account at the bank. While the foregoing scenarios seem plausible, and even likely, they are, nonetheless, still speculation. The currently-available data allow no corroboration.[22]

Finally, Table 4 shows the number and percentage of firms in each sample that existed in 1903, when the data series begins. Forty-eight percent of the sample's attached firms were already in operation (as joint-stock firms) in 1903, while 36 percent of the unattached firms existed before that year.[23] Overall, however, the average age of attached and independent firms is approximately the same.

The comparisons made in Table 4 can be viewed from two perspectives. First, the lower average normalized investment combined with higher average normalized liquidity and profits may imply that firms with a BCI connection were able to invest whenever propitious opportunities arose. Furthermore, with the advice of bank representatives, attached firms may have selected projects more carefully than independent firms, so that chosen projects might have been of particularly high quality. The combination of bank services might, therefore, lead to lower normalized investment and higher normalized profits relative to unattached firms.

Alternatively, one might view the statistics in Table 4 as evidence of a selection bias on the part of BCI. Perhaps the bank offered its services mainly to established firms with records of high profitability. Such conduct seemingly runs counter the risk-taking, entrepreneurial behavior most historians ascribe to German-style banks. If such selection occurred, it could be interpreted as successful *ex ante* monitoring by the financial intermediary. That is, in order to choose its investments, a bank must first observe–to the extent possible–the operations of potential targets. Knowing that the bank has effectively screened its associated firms, risk-averse investors will prefer to make deposits (or purchase shares) through the bank rather than hold shares in an unattached firm.

[22]Again, the German case may be illuminating. Proxy voting by universal banks expanded rapidly around the turn of the last century and may have accounted for the upswing in interlocking directorates around the same time.

[23]For firms reported as constituted as of 1903, data is missing in the first year of the sample for four of the thirty-two attached firms and ten of the 22 unattached firms. Since all joint-stock firms were required to report an annual balance sheet, the missing data raises the possibility that the reported constitution date might have been the original founding date after all. If so, this might suggest that attached firms tended to be transformed earlier than unattached firms.

Thus, the quality signaling provided through *ex ante* monitoring by the intermediary may be as important to depositors as the promise of interim and *ex post* monitoring of firms' performance.[24]

These two explanations for the high profitability of attached firms are not mutually exclusive, and thus the truth may lie somewhere in between. Unfortunately, data constraints prohibit the explicit comparison of profitability or other measures of performance before and after the establishment of bank connections. Nonetheless, the possibility of selection bias is real and should be accounted for in comparing the investment behavior of attached and independent firms. The logit analysis in the final section investigates further firm characteristics that are systematically related to bank attachment.

MODEL SPECIFICATIONS AND RESULTS

Tobin's Q theory of investment is the traditional starting point for investigations of investment equations. In such a framework, capital markets are assumed to be perfectly functioning and, thus, investment should be a function only of its expected profitability (measured by Tobin's Q). Under these strict assumptions about credit markets, internal liquidity of firms does not play a role in the investment decision. If capital markets do not function efficiently today, however, they can hardly be assumed to have done so nearly one hundred years ago. There is, therefore, compelling reason to believe that inside liquidity may have played a significant role in the timing of industrial investment.

The question is whether involvement in a bank network resolves all or part of the firms' information problems and thereby reduces firms' dependence on internal finance. By comparing the liquidity sensitivity of investment of bank-attached and independent firms, the following analysis estimates the information advantage of bank relationships. The results show that liquidity plays an important role in investment for many firms and that bank attachment ameliorates this liquidity sensitivity only in certain cases.

The basic investment equation to be estimated is the following.

$$\frac{I_{it}}{K_{it}} = b_1 \frac{SL_{it-1}}{K_{it-1}} + b_3 B + b_4 B \frac{SL_{it-1}}{K_{it-1}} + b_5 T_t + \epsilon_{it}$$

Thus, investment is regressed on stock liquidity (SL), an indicator variable for attachment to BCI, the interaction of this dummy variable with liquidity ($B * SL$), and a trend variable (T_t). The interaction term between the attachment indicator and liquidity allows a comparison of slopes between attached and unattached firms. The trend variable is included instead of annual indicator variables in order to spare degrees of freedom while still accounting for effects related to time. Investment and stock liquidity are as

[24]See Aoki (1995) for a discussion of corporate governance forms and *ex ante*, interim, and *ex post* monitoring.

previously defined and are normalized by the firms' annual share capital to reduce the possibility of heteroskedasticity and to control for size effects. In addition, all t-statistics are computed using White-corrected, heteroskedastic-consistent standard errors.[25]

Lagged investment, a variable that would account for time aggregation effects, is eliminated from the model since it does not enter significantly and including it causes the loss of an extra year of observations for each cross-sectional unit. Moreover, including lagged investment alters the coefficients on liquidity only for start-up firms (and does so dramatically), but this effect is largely due to the elimination of more than three quarters of the observations for start-up firms (only 19 of 80 observations remain). Since lagged investment is, by definition, missing for the first year of a firm's existence, any firm whose first year falls during the sample period drops out of the sample until the second year of operation. Firms that reported data in their constitution years, and therefore appear in the sample for year zero as well as year one, account for the remaining 19 start-up observations. The case of newly-public firms is discussed at length later in this section.

A number of limitations in the data should be acknowledged. First the source offers no data on production or sales. This is only a problem in the sense that, despite little theoretical justification, previous empirical studies of investment have shown that an "accelerator effect" may exist: higher production in one period may signal the need for higher production in the next period. If liquidity is highly correlated with production, then exclusion of production will bias the coefficients on liquidity.[26] Several recent studies have shown that lagged revenues or production, while often entering the regression equation significantly, does not alter the coefficients on liquidity significantly.[27]

The source data also omit several variables necessary for calculating an average or marginal Tobin's Q. Even common-equity q can be estimated for only a subset of firms, since fewer than half of the sampled firms had stock market listings and, therefore, quoted share prices. The absence of Q data raises the same empirical concerns as those raised by the lack of production data, but Tobin's Q is similarly unimportant in its effect on coefficients. Furthermore, even in cases of plentiful data, since Tobin's Q is notoriously difficult to estimate, regression coefficients rarely permit structural interpretation. In the absence of Q data, I have attempted to control for the effect of expected future profitability by including one or two lags of profits as well as percent dividend payments in various specifications of the model. None of these attempts has yielded significant coefficients on the profit variables or has altered the coefficients on liquidity. Thus, the lack of production and Q data in this study should be borne in mind but should not undermine the credibility of the findings on liquidity sensitivity.

Finally, the data source reports only the total stock of liquid assets and, therefore, does not permit the elimination of long-term securities from the measure of firm liquidity. This creates problems for interpreting liquidity sensitivity only if bank-attached firms are

[25]See White (1980).

[26]See Jorgenson (1971) for a review of earlier work on investment.

[27]See Hoshi, Kashyap, and Scharfstein (1991), Elston (1995), Fohlin (1995b), and Ramirez (1995).

likely to hold a substantially different proportion of their portfolios in the form of illiquid securities. The ramifications of such a possibility are discussed at the end of this section, in the context of interpreting the coefficient estimates.

The analysis estimates two different econometric models to test the relative liquidity sensitivity of investment for attached and independent firms: within groups (fixed effects) and generalized least squares (GLS or random effects) with Heckman-type selectivity corrections. The models are based on Hausman and Taylor (1981) and Dubin and McFadden (1984), and the necessary adaptations are derived and described in detail in Fohlin (1995b). Briefly, the fixed effects model is created by subtracting from each observation of a variable the time average of the variable for each cross-sectional unit. Thus, the fixed effects model is equivalent to a simple pooled regression in which an indicator variable is included for each cross-sectional unit. Since bank-attachment status is constant throughout the period in question, Heckman-type selectivity corrections are inappropriate in the fixed-effects model. One might imagine, however, that selectivity biases related to bank attachment might be captured at the firm level, and such individual effects are eliminated in the fixed-effects model.

The GLS model is formed by multiplying the time average of each variable by a parameter theta before subtracting this product from each observation of the variable. The weight, theta, is based on the ratio of variances from the within and between (OLS on time averages of the variables) groups estimators. In the case of a balanced panel, Hausman and Taylor (1981) show that GLS estimation is equivalent to a weighted average of these two estimators. Since the current panel is unbalanced, the parameter, theta, must be computed for each cross-sectional unit. Since the random effects model retains individual effects, correction terms–based on a logit model of characteristics of bank attachment–are included as additional exogenous variables. These Heckman-type correction terms measure the systematic bias that is due to selection into a particular group–that of bank-attached firms in the current case. In the current framework, the selection term is interpreted as the *a priori* effect on investment due to bank attachment. Theoretically, the remaining coefficient estimates are no longer biased by the supposed endogeneity of the right-hand-side variables.

Despite its theoretical appeal, however, the random effects model, and Heckman-type corrections in addition, require stringent assumptions that may diverge from the reality of this sample. For example, the random effects model assumes that the exogenous variables are uncorrelated with the regression error. This is probably an erroneous assumption. Furthermore, the point of the random effects model is to account for the randomness of the particular draw that is chosen in the given sample. Since the sample comprises nearly all attached firms, this central assumption of the random-effects model is clearly violated. Finally, in order for the selectivity correction terms to adequately control for the endogeneity of the right-hand side variables, the discrete-choice model must capture the effects of group selection. Thus, the success of the GLS selectivity correction model depends on the proper specification of the logit model of bank attachment. In nearly every case, the failure of the correction terms to attain statistical significance, compounded by

the fragility of the GLS assumptions, recommends the choice of the fixed-effects model over GLS.

The first column of Table 5 reports fixed effects estimates of equation 1. The coefficient on stock liquidity is extremely high, 1.27, implying that every additional unit of liquidity induces unattached firms to increase investment by more than one unit. The coefficient on the interaction of stock liquidity with the attachment indicator is large and negative, -1.11, suggesting that the liquidity sensitivity of attached firms is very low (0.16). Thus, the apparent finding is that unattached firms–as predicted–experience far greater liquidity sensitivity of investment than do attached firms. The extremely high coefficient on unattached firms' liquidity is suspect, though, and warrants closer scrutiny of the data.

A look at the underlying data suggests that one observation in the sample exerts extreme influence on the regression results. The firm in question–Fabbriche Riunite Way-Assauto–was a mechanical engineering manufacturing firm. This firm was constituted in 1906 and required significant investment in physical capital in its first year of operation. Nonetheless, the extremity of this firm's normalized investment and liquidity stems mainly from its low paid-in capital in its first year. Share capital was on the order of one hundred thousand Lire in the firm's first year but rose to two million in the following year. Since the firm's share capital remained constant for the remainder of the period, it seems reasonable to adjust the share capital up in the first year. This allows retention of the data point–and there is no compelling reason to discard it–while also dampening its influence on the regression results.

Table 5 here.

The third column of Table 5 gives the fixed-effects estimates of equation 1 when the extreme outlier is adjusted. Since the outlier firm was unattached, the effect of adjusting the outlier is felt on the unattached liquidity coefficient. The new estimate falls into a much more intuitively-reasonable range than it did prior to adjustment. The ratio of estimated liquidity coefficients for unattached relative to attached firms drops from eight to three with the adjustment to the outlier share capital. Since the new coefficient estimates decline significantly in absolute value, while the standard errors remain approximately constant, the t-statistics weaken. For unattached firms, the statistical significance of the liquidity coefficient estimate remains above the one percent level, while it falls to ten percent for attached firms. Finally, the adjusted R-squared declines by nearly half with the adjustment of the outlier, but that is to be expected given that the outlier only magnified the relationship between the dependent and independent variables.[28]

Certain types of firms might be expected to behave differently than others, and the analysis shows that coefficients on liquidity vary depending on the population under

[28]Fohlin (1994) employs a limited-influence estimator to reduce the impact of all extreme outliers without making adjustments to the share capital of the outlier observation. The method is based on Flavin's (1991) implementation of Huber's (1973, 1977) estimator. The current adjustment creates similar end-results with less econometric apparatus.

consideration. Two situations in particular might lead to a heightened sensitivity to liquidity for firms' investment: early stages of development and periods of intensive investment. Of 859 observations (firms times years) in the current sample, 486 (56.6 percent) are associated with positive investment. Thus, investment is frequently non-positive. To be sure, firms may refrain from investing because it is undesirable, or it may be due to insufficient investment funds.

The probability of having positive investment is naturally very high when conditioned on status as a start-up firm (approximately eighty-five percent in the current sample), but only 80 of the positive-investment observations in the current sample are attributable to firms in their first year of operation as joint-stock firms. Information problems are likely to be more severe in the early stages of a firm's lifespan and are only compounded by the need for sizeable investment in new plant and equipment. Thus, it is important to test for the possibility that new firms have tighter liquidity constraints than established firms, and that this effect is attenuated by bank attachment.

Including indicator variables for positive investment as well as year-one status (coinciding with positive investment), both interacted with liquidity alone and with bank attachment and liquidity combined, gives an estimate of the differences in liquidity sensitivity attributable to membership in the various categories.[29] The second and fourth columns of Table 5 report the fixed-effects estimates for this new specification (Equation 2) with and without the correction of the extreme outlier. Among firms with non-positive investment, coefficients on the stock of liquid assets are very small and statistically insignificant regardless of bank-attachment status. The positive and statistically significant coefficient on liquidity interacted with positive investment suggests that liquidity constraints are binding for investing independent firms. More importantly, the small, insignificant coefficient on the three-way interaction of liquidity with both bank attachment and positive investment indicates that such liquidity constraints are equally tight for bank-attached firms.

When new, or IPO, firms are considered, the findings seem to partially vindicate the bank. Liquidity sensitivity for investing year-one firms is very high and statistically significant for firms without bank attachments–indicating that new firms do experience a great deal more sensitivity of investment to liquidity than older firms. Furthermore, the liquidity coefficient for unattached firms is two and a half times that of bank-attached firms in the same category–suggesting that bank connections played an important role for new joint-stock firms. Column one of Table 6 summarizes the coefficient estimates on liquidity by firm type for those firms with positive investment. Columns two and three are explained subsequently.

Table 6 here.

[29]Since some new firms reported their first balance sheet in the year of founding and others did so in the following year, all firms of age zero or one are considered start-up (or, perhaps more accurately, IPO) firms. Thus, firms that reported balance sheets in the same year as they were constituted, appear for two years in the year-one category. This does not appear to influence the results.

The findings on newly-public firms reintroduces the questions, raised in the previous section, about the meaning of the constitution date. Recall that it is not clear from the source whether the reported date indicates the original founding or the transformation into a joint-stock company. On the one hand, an initial public offering indicates, even for existing firms, the onset of a new stage in the firm's life cycle–a phase that often entails new investment and expansion of business. On the other hand, transforming firms, because of their accumulated experience under a previous organizational structure, may represent a less risky investment than true newcomers. When both characteristics coincide–the need or desire for new investment along with a reassuring track record–the result may be an opportunity for safe and profitable business on the part of underwriting banks. Banks might select the most profitable or liquid new firms to underwrite, thus giving the false impression that they have attenuated liquidity constraints.

Furthermore, if bank-attached firms were young in a systematically different part of the sample period, there may be trend effects that affect attached firms differently than unattached firms. In particular, if attached firms were young in the early part of the period, when the economy was growing the fastest, and unattached firms tended to be young during the crisis years of 1907 or 1908, then investment patterns might vary quite independently of attachment status.

Table 7 compares the distribution of newly public firms over the sample period and also reports average stock liquidity and profits (both normalized by share capital) for the new firms in each year. Since the indicator variable for year-one status includes firms of age zero or one, several firms appear twice. The annual breakdown shows convincingly that the time distribution of young firms is nearly the same for attached and independent firms. Average profits seem to be similar for the two sub-samples–though distinctly higher for attached firms in 1908 and higher for unattached firms in 1905. Profits continued to be low for unattached new firms in the late years unpopulated by young, attached firms.

Table 7 here.

In 1908, the firms given as year-one firms were, with the exception of one unattached firm, all constituted in 1907. Clearly, the rate of new foundings dropped off significantly immediately following the stock market crash of 1907. Indeed, only two firms in the sample–both unattached firms–were established after 1907. To confirm that the young firms founded late in the period do not exert undue influence on the previous results, I have rerun the fixed-effects regression for the period before 1908 (thus excluding the few unattached firms that were founded during or after the crash). The results are unchanged, and this suggests that the timing of arrival of young firms into the sample does not bias the results on liquidity constraints.

Unlike the patterns in the entry of new firms and of normalized profits, average normalized stock liquidity is clearly different–much higher–for new, attached firms than for new, unattached firms in every year of the sample. The sample means in Table 4 uncovered the same divergence in the full sample, and it is a point worth addressing. The first part of this section raised a number of constraints of the data, including the

aggregation of short- and long-term securities under one heading. I suggested that this might cause difficulties in interpreting the liquidity coefficients, if the attached firms held a systematically different share of their portfolios in illiquid securities or participations than did unattached firms.

There is no way to determine with the current data what proportion of securities was illiquid, and it would be pure speculation to produce an estimate. One might, however, pose the following counterfactual. If bank-attached and independent firms held similar levels of available liquid assets, and if the excess of attached firms' portfolios over that of unattached firms were actually unusable for investment purposes (for example, a firm might have held shares in a subsidiary for which the new investment was targeted), what would liquidity sensitivity be for attached firms?

Two exercises reveal some useful information for determining the effects of systematic overestimation of attached firms' levels of liquidity. First, running the same fixed effects model as before, but assuming that attached firms' true liquidity was the same as unattached firms on average (in this case, 60 percent of reported levels) yields estimated liquidity sensitivity for attached firms assuming constant levels of investment. Column two of Table 6 gives the new coefficient estimates and indicates that young, attached firms' liquidity constraints would have been somewhat more binding if the stock of liquid assets were consistently lower. Despite this adjustment, liquidity sensitivity for young, independent firms would remain at least twice as high as that estimated for attached firms. Older, attached firms' liquidity constraints remain unchanged in this exercise.

A second experiment takes the opposite approach and searches for the average level of attached firms' liquidity that produces liquidity sensitivity, for the given level of investment, similar in magnitude to that of independent firms. Column three of Table 6 shows the estimated coefficients, assuming coefficients significant at less than the ten-percent level are equal to zero, for the case in which attached firms' true liquidity is 45 percent of reported liquidity. Thus, to equalize liquidity sensitivity for unattached and attached, young firms, 55 percent of attached firms' portfolios must be assumed to be illiquid. Such an assumption stretches credibility, especially compared to unattached firms' portfolios, which are assumed to have been completely liquid. Furthermore, this exercise implies that to equalize liquidity sensitivity across groups, attached firms' average liquidity must fall to 84 percent of independent firms' average liquidity–though this stems partly from the relatively low investment of bank-attached firms.

These two exercises suggest that the high liquidity of bank-attached firms may account for a small part of the difference between the estimated liquidity constraints of attached and independent firms, but that extreme assumptions must be made about systematic overestimation of attached firms' usable liquidity in order to produce similar liquidity sensitivity for the two samples of young firms. Moreover, manipulations of the liquidity data has little effect for firms that were beyond their first year, and this category comprises the vast majority of the observations. Thus, as suggested at the beginning of this section, the fixed effects model, by removing individual effects, mitigates the effects of

selectivity bias. Therefore, the findings, that liquidity constraints were largely unchanged for the vast majority of bank-attached firms, but that attachment was associated with significantly lower liquidity sensitivity among the youngest firms, are robust to a wide range of assumptions about attached firms' liquid assets.

SELECTION OF BANK-ATTACHED FIRMS REVISITED

Given the apparently large size, liquidity, and profitability differentials between attached and independent firms overall, it is natural to wonder whether the results on liquidity constraints are based on factors other than involvement with a universal bank. While the fixed effects specification eliminates firm-specific bias and seems to have successfully dealt with the potential endogeneity of liquidity, the GLS specification of the panel model allows the inclusion of Heckman-type correction terms to test explicitly for selection bias. The results indicate that, while the logit analysis of variables correlated with bank attachment yields significant findings, the correction term that is computed from those results is not statistically relevant and does not alter the coefficients in the GLS specification. The change to the GLS specification has some apparent effect on the liquidity coefficients for investing firms that were not in their first years, but given the reservations detailed at the start of the previous section, the GLS results with and without selectivity corrections are reserved for the appendix.

Table 8 gives the results of the logit analysis, in which a binomial indicator variable for bank attachment is regressed on several variables that are hypothesized to be correlated with bank attachment. The first three columns of Table 8 present the coefficient estimates for the main logit model tested under three specifications of the exogenous variables. Column one uses levels of liquidity and investment, while columns two and three use normalized variables. Column three differs from column two only in the adjustment of the share capital of the extreme outlier.

Table 8 here.

The single strongest indicator of bank attachment–regardless of specification–is size. In all cases, share capital obtains highly significant coefficients, and in the model with normalized variables and the adjusted outlier, share capital is the only variable with better than 10 percent significance. The fourth column shows the results of removing share capital from the specification of column three. Clearly, the predictive power of the logit regression declines drastically–from 85 percent to 68 percent–with the elimination of the size indicator. The Chi-squared statistic also falls dramatically when size is excluded, though the P-value remains less than one percent. Substituting the stock of fixed assets for share capital produces comparable results and does not provide additional information when the two variables are included together.

Other variables are distinctly less significant in the logit regression but are worth mentioning. The stock of liquid assets, while higher on average for attached firms than

unattached firms, appears to be a poor indicator of bank connections. The estimated coefficient on liquidity, whether normalized or not, is high but is also associated with high standard error. Only when the size indicator is absent, as in column four, does stock liquidity achieve the ten percent level of significance. This finding provides further evidence that the fixed effects regressions are free of systematic bias due to the high average liquidity of attached firms: clearly, there are several bank-attached firms with particularly high normalized liquidity, but there are also many with levels on par with those of independent firms.

The findings on investment are also illuminating. Attached firms apparently invest less on average, but the effect is noticeably tempered with size controls. Adjusting for the extreme outlier, as in column three, renders statistically insignificant the estimated coefficient on normalized investment. Attached firms with large share capital do not necessarily invest more: investment and share capital are much more highly correlated for unattached firms than for attached firms (80 percent versus 49 percent). This suggests that unattached firms issue new equity in order to invest in fixed capital, while attached firms use other means–a result that finds further support in the evidence on debt-equity ratios.

The coefficient on debt-equity ratios is positive but is only significant when share capital is excluded from the specification. Arguably, the upward adjustment of the outlier capital distorts the truth, but it seems more likely that leaving the share capital artificially low causes greater divergence from reality than the adjustment does. The high standard error on debt-equity ratios indicates that, while many attached firms have markedly higher debt-equity ratios than independent firms, the pattern is insufficiently widespread to provide a good indicator of attachment in general. This is a weaker result than might be expected, since bank involvement should lower a firm's cost of debt relative to equity and should, therefore, make debt financing more advantageous to attached firms relative to unattached firms. If, however, bank attachment is important for *ex ante* monitoring, and if the presence of bankers on a firm's board conveys important signals to the capital market, then perhaps the results are simply revealing countervailing forces in the financing decisions of attached firms. The cost of both debt and equity may be lowered for bank-attached firms relative to independent firms. As reported previously, the average bond rates for attached and independent firms are approximately the same. These numbers only capture firms that chose to issue bonds, and as such they may suffer from selection bias.

Other variables provide additional insight into the characteristics of bank-attached firms and therefore into the bank's policies. The results for the age variable reinforce the similarity between attached and independent firms in the sample means and in the distribution of start-up firms given in Table 7. Age is a poor indicator of bank attachment. Young firms actually made up a slightly smaller proportion of the bank's clientele than in the general population of joint-stock firms. According to these findings, therefore, one cannot laud BCI for playing a particularly crucial role in fostering young firms and new industry. Neither, however, can one criticize the bank for relying solely on long-

established firms.

The logit analysis also shows that profits serve as only a weak indicator of bank attachment. While average normalized profits are higher for attached firms than for unattached firms, the high standard error on profits in the logit regression suggests that the tendency is variable. Parallel results appear for percent dividends paid. Bank-attached firms paid higher dividends on average, but that is likely a straightforward result of higher profits. The correlation between normalized profits and percent dividends is markedly higher for attached firms (88 percent) than for independents (50 percent).[30] This disparity might be further indication of successful *ex ante* monitoring on the part of BCI, or it may suggest the more sinister conclusion that the bank coerced its associated firms to pay out their unusually high profits in the form of dividends. The former explanation seems more plausible, especially given that payments to board members were actually slightly lower, relative to share capital and profits, for attached firms than for independent firms.[31]

The results of the investment regressions, together with the findings from the logit analysis of attachment indicators, suggest that bank attachment was more important for *ex ante* monitoring than for interim or *ex post* monitoring. That is, since liquidity sensitivity was equally high for attached and unattached firms that were investing but that were not in their first years, and since such firms constitute the majority of the sample, there appears to have been little tangible benefit accruing to bank-attached firms after the earliest years of involvement. Furthermore, the fact that attached firms invested less overall than unattached firms, while perhaps indicating prudence and restraint on the part of banks, provides evidence that BCI did not foster unusually high rates of investment among its client firms. Nonetheless, since bank-attached firms were significantly different from independent firms, BCI may have been an important information intermediary–culling out high-quality firms and signaling this fact to investors.

COMPARISONS WITH THE GERMAN CASE

The findings for Italy accord well with those of an analogous study on the impact of bank relationships on the investment patterns of German firms during industrialization.[32] The German study covered a longer period, 1880-1910, and found that the role and policies of the universal banks changed toward the very end of the nineteenth century. Because of this shift, the analysis is broken into two sub-periods–before and after 1900. The study includes two samples of firms. Sample I consists of 50 long-lived firms and,

[30]The same is true for the correlation between levels of profits and percent dividends, which is 54 percent for attached firms and only 22 percent for independent firms.

[31]Payments to the board averaged 0.4 percent of share capital and four percent of profits for attached firms, while they averaged 0.5 percent of share capital and six percent of profits for independent firms. Payments as a share of profits ranged from zero to 16 percent for attached firms and from zero to 26 percent for unattached firms. These variables are statistically insignificant when included in the logit equation, even when dividends and other profit measures are excluded.

[32]Fohlin (1995b). Further details relating to both studies are available in Fohlin (1994).

with a few exceptions, contains data for each firm in each year of the period. Sample II covers 25 newly-public firms for the same period. Since founding dates ranged between 1880 and 1900, Sample II is quite unbalanced.

For the two samples of firms, Table 9 gives the qualitative results on liquidity sensitivity by sub-period and category of firm. In the first part of the period, both the start-up and long-lived firms with bank attachments apparently encountered far looser liquidity constraints than those who did not–even in the short run. There was no perceivable difference in the liquidity sensitivity of older versus younger firms within each sample, though the unattached firms in sample II (the start-up firms) did experience higher liquidity sensitivity than the unattached firms in sample I (the established firms). These results parallel those found for Italian firms.

The pattern in the second part of the period is quite different. Liquidity sensitivity was higher for bank-attached firms than for independent firms. Among attached firms in Sample I, liquidity constraints were apparently less binding for older-than-average firms than for younger-than-average firms–suggesting that information accrued over time and, thus, financial intermediaries attenuated liquidity constraints only in the long run. In contrast, estimated liquidity sensitivity of investment was statistically insignificant for unattached firms in both samples, regardless of age. In Sample II, liquidity constraints among attached firms did not loosen with age, however, liquidity sensitivity was lower among the attached firms in Sample II than among the attached firms in Sample I.

As in the Italian case, firms with bank attachments were significantly different than independent firms, and in both countries, the strongest correlate of attachment is size. Similarly, average normalized liquidity and, in the early part of the period for Germany, normalized profits, were higher for attached than unattached firms. In Germany, unlike Italy, attached firms invested more and experienced lower (if different at all) debt-equity ratios than unattached firms.

CONCLUSIONS

The findings of this paper suggest that German-style universal banking played a limited role in determining the levels and timing of investment for Italian firms during industrialization. The results indicate that, among bank-attached firms, only newly-founded joint-stock companies experienced distinct reductions in their liquidity sensitivity of investment. Thus, the findings lend only weak support for the notion that universal banks are particularly well-suited to ameliorate market imperfections that create opportunities for moral hazard problems and cause inefficient industrial investment. Differences between attached and independent firms, however, suggest that bank relationships may have been useful for filtering out undesirable firms and signaling firm quality to potential investors. Nonetheless, if banks offered entrepreneurial advice to their associated firms, such insight resulted in only small and spotty improvements in profitability relative to the general population.

The current study offers deeper insight when compared to its German counterpart during the same period. The German study reinforces the results of this paper and, in doing so, indicates some generality in the findings. The changing patterns of investment and liquidity sensitivity in Germany indicates that the role of universal banks evolved over time and raises questions about the long-term effects of the financial system. Since the Italian credit banks only began operations in 1894 and ceased operating as German-style universal banks after the first world war, it may be infeasible to test for similar changes in the Italian case. The findings for Italy appear to correspond more closely to the pre-1900 results for Germany–when that country was in a similar stage of development–than to the contemporaneous period. This suggests that the functions of universal banking, and of financial institutions in general, are dictated by the conditions of the economy in which the institution operates.

The results of this and the German study contradict, at least partly, the Gerschenkronian view of the importance of financial institutions in promoting industrialization. In both cases, universal banks are found to have exercised only limited influence on the timing and magnitude of industrial investment at the firm level. The results also give little indication that universal bankers offered entrepreneurial advice to their clients as a rule, or, if they did, that it resulted in consistently superior performance. To the extent that bank-attached firms did experience higher profits, it is unclear whether such differences stemmed from bank advice or was an artifact of the banks' ability to pick winners. Given the mild influence felt at the firm level, the economy-wide impact of this particular financial structure is likely to have been small.

The results of this work also conflict with those of a number of recent papers on relationship banking and its influence on industrial investment. In particular, the findings that bank-attached firms experience attenuated liquidity constraints only in certain, limited circumstances, and that bank-attached firms are significantly different than the general population of firms are at odds with both Hoshi, Kashyap, and Scharfstein's (1991) study of the post-World War II Japanese Keiretsu and Ramirez's (1995) study of J.P. Morgan and his clients.[33] Differences in results may stem from a number of causes: variation in sources and quality of data, dissimilarity of models and variables measured, or differences in the time periods and countries examined.

The discrepancies among findings caution against strong interpretations of, or sole reliance on, investment equation estimates for understanding the role of financial institutions. Thus, this paper, and other work using this methodology, should be viewed as one part of a larger story–one that requires significant further attention. Nonetheless, this work, particularly when taken in concert with the German study, indicates that prevailing notions about financial structure overstate the importance of large-scale universal, relationship banking in industrial development.

[33]The findings are similar to those in Houston and James (1996).

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